

PATENT COOPERATION TREATY

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

PLOUGMANN, VINGTOFT & PARTNERS
Sankt Annae Plads 11
P.O. Box 3007
DK-1021 Copenhagen K
DANEMARK

PLOUGMANN
VINGTOFT
& PARTNERS

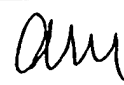
25 SEP. 1998

PLV/LP

Date of mailing (day/month/year) 14 September 1998 (14.09.98)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 19975 PC 1	
International application No. PCT/DK98/00335	International filing date (day/month/year) 16 July 1998 (16.07.98)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 18 July 1997 (18.07.97)
Applicant DANISCO A/S et al	

- The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
- An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
18 July 1997 (18.07.97)	0878/97	DK	02 Sept 1998 (02.09.98)
22 July 1997 (22.07.97)	60/053,451	US	11 Sept 1998 (11.09.98)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer Antonia Muller  Telephone No. (41-22) 338.83.38
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/DK 98/00335

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A21D8/04 A23L1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A21D A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 01727 A (QUEST INT ; DUIJNHOFEN ANTON A G VAN (NL)) 19 January 1995 see page 6, line 1 - page 7, line 8; claims ---	1-25
A	WO 95 29996 A (NOVONORDISK AS ; OXENBOELL KAREN M (DK); SI JOAN QI (DK); AAGAARD J) 9 November 1995 see page 12, line 29 - page 13, line 13; claims ---	1-25
A	WO 96 39851 A (DANISCO ; SOEE JOERN BORCH (DK); POULSEN CHARLOTTE HORSMANS (DK); H) 19 December 1996 cited in the application see page 6, line 15 - page 7, line 21; claims --- -/--	1-25

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search

26 October 1998

Date of mailing of the international search report

30/10/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bevan, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/DK 98/00335

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 195 41 846 A (FISCHER HEINRICH DR) 22 May 1997 see the whole document ---	1-25
A	WO 94 28728 A (NOVONORDISK AS ;SI JOAN QI (DK)) 22 December 1994 see claims -----	1-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/DK 98/00335

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9501727	A	19-01-1995	AU 6926794 A	06-02-1995
WO 9529996	A	09-11-1995	AU 695391 B	13-08-1998
			AU 2445095 A	29-11-1995
			CA 2189542 A	09-11-1995
			EP 0758377 A	19-02-1997
			US 5741688 A	21-04-1998
WO 9639851	A	19-12-1996	AU 5997296 A	30-12-1996
			CA 2224203 A	19-12-1996
			EP 0833563 A	08-04-1998
			NZ 309735 A	26-08-1998
			PL 323744 A	14-04-1998
DE 19541846	A	22-05-1997	NONE	
WO 9428728	A	22-12-1994	EP 0702519 A	27-03-1996

PCT

**NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES**

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

PLOUGMANN, VINGTOFT & PARTNERS
Sankt Annae Plads 11
P.O. Box 3007
DK-1021 Copenhagen K
DANEMARK

Date of mailing (day/month/year) 28 January 1999 (28.01.99)		<div align="center">IMPORTANT NOTICE</div>	
Applicant's or agent's file reference 19975 PC 1			
International application No. PCT/DK98/00335	International filing date (day/month/year) 16 July 1998 (16.07.98)	Priority date (day/month/year) 18 July 1997 (18.07.97)	
Applicant DANISCO A/S et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU,BR,CA,CN,EP,IL,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

**AL,AM,AP,AT,AZ,BA,BB,BG,BY,CH,CU,CZ,DE,DK,EA,EE,ES,FI,GB,GE,GH,GM,HR,HU,ID,IS,KE,
KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,
SL,TJ,TM,TR,TT,UA,UG,UZ,VN,YU,ZW**

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 28 January 1999 (28.01.99) under No. WO 99/03351

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

<p align="center">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. (41-22) 740.14.35</p>	<p>Authorized officer J. Zahra</p> <p>Telephone No. (41-22) 338.83.38</p>
---	--

1/4

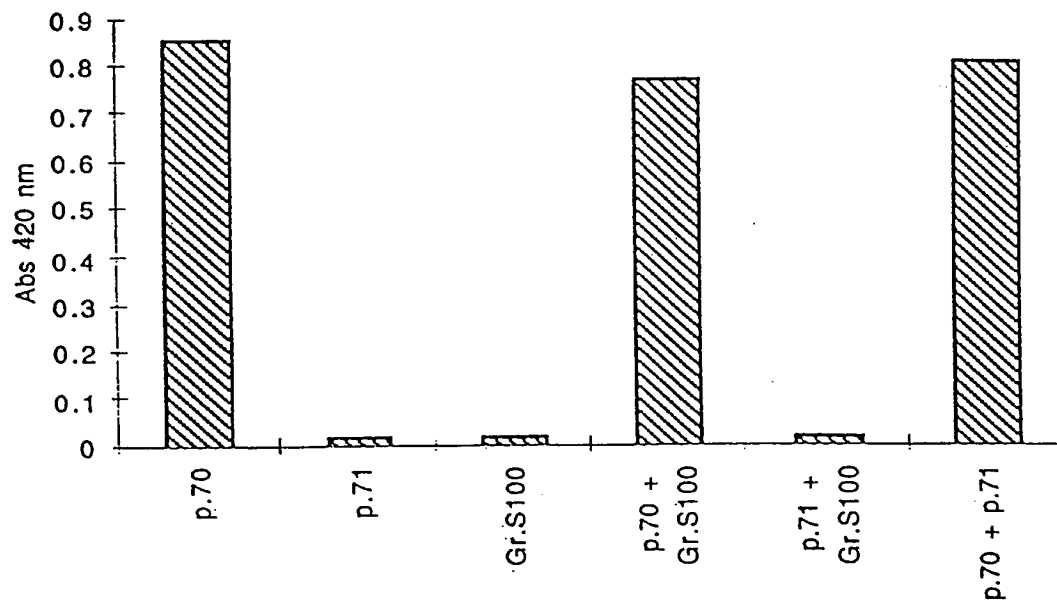


Fig. 1

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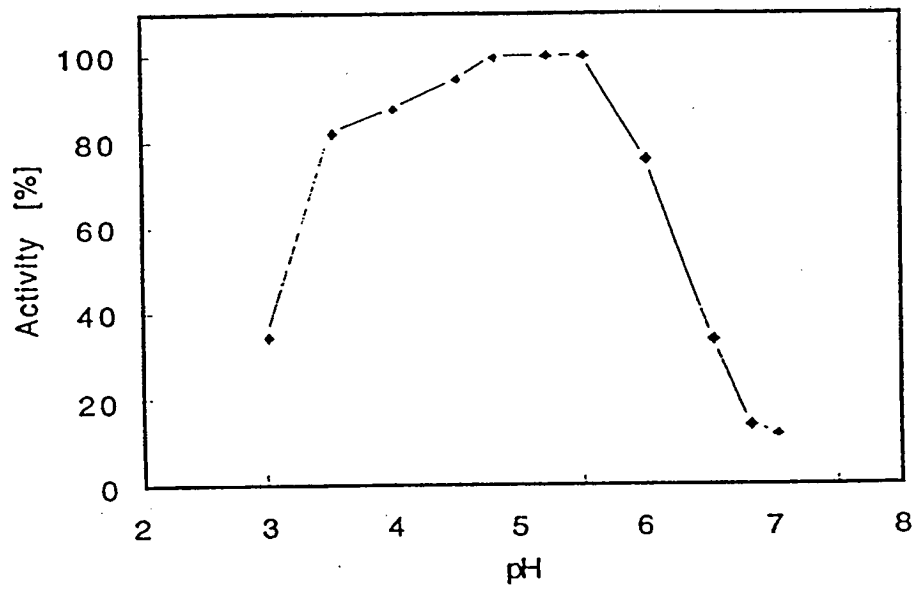


Fig. 2

3/4

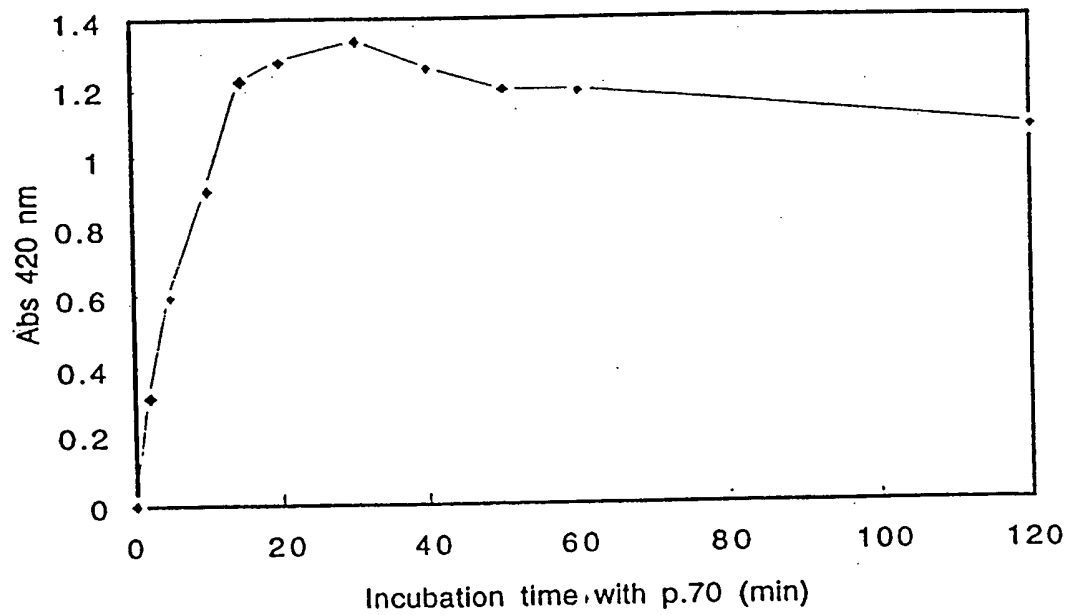


Fig. 3

4/4

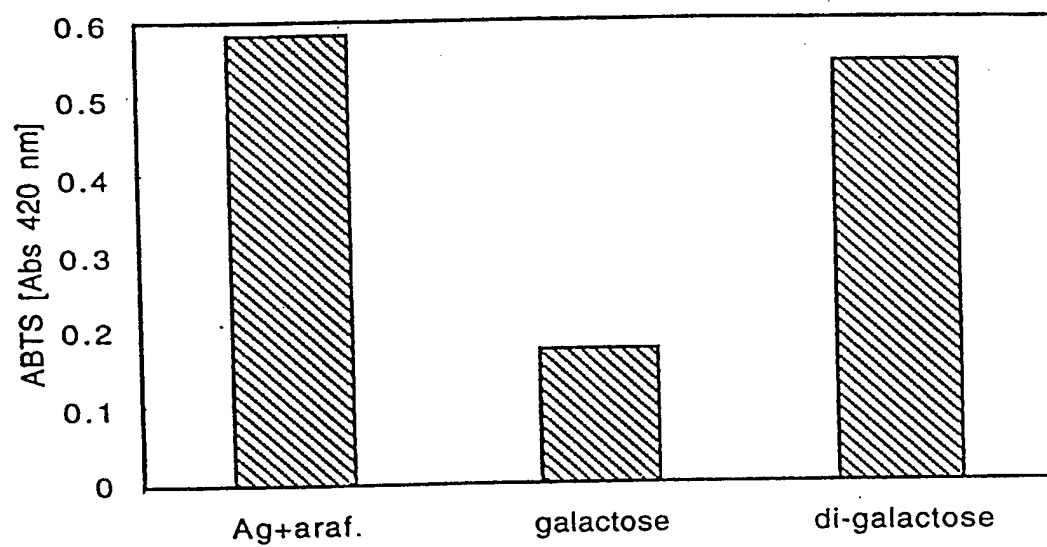


Fig. 4

PCT

REQUEST

16 JULI 1998

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

19975 PC 1

Box No. I TITLE OF INVENTION A COMPOSITION COMPRISING AN ENZYME HAVING GALACTOSE OXIDASE ACTIVITY AND USE THEREOF

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

DANISCO A/S
Langebrogade 1
DK-1001 Copenhagen K

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (i.e. country) of nationality:

DK

State (i.e. country) of residence:

DK

This person is applicant
for the purposes of:

☐ all designated
States

☒ all designated States except
the United States of America

☐ the United States
of America only

☐ the States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

ROUAU, Xavier
16, rue la Raffinerie
34000 Montpellier
France

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box
is marked, do not fill in below.)

State (i.e. country) of nationality:

FR

State (i.e. country) of residence:

FR

This person is applicant
for the purposes of:

☐ all designated
States

☐ all designated States except
the United States of America

☒ the United States
of America only

☐ the States indicated in
the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Plougmann, Vingtoft & Partners
Sankt Annae Plads 11
P.O. Box 3007
DK - 1021 Copenhagen K
Denmark

Telephone No.

+ 45 33 63 93 00

Facsimile No.

+ 45 33 63 96 00

Teleprinter No.

☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

SCHRØDER, Mette
Lykkegårdsvej 23
6000 Kolding
Denmark

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

DK

State (i.e. country) of residence:

DK

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

SØE, Jørn Borch
Orøvanget 11
8381 Mundelstrup
Denmark

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

DK

State (i.e. country) of residence:

DK

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AT Austria ...and utility model | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BB Barbados | |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic and utility model | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany ...and utility model | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark ...and utility model | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia ...and utility model | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland ...and utility model | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia ...and utility model |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GW Guinea-Bissau | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> JP Japan | |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> YU Yugoslavia |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |
| <input checked="" type="checkbox"/> LR Liberia | |
| <input checked="" type="checkbox"/> LS Lesotho | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

☒ HR Croatia

☐

In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of _____

The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM Further priority claims are indicated in the Supplemental Box ☐

The priority of the following earlier application(s) is hereby claimed:

Country (in which, or for which, the application was filed)	Filing Date (day/month/year)	Application No.	Office of filing (only for regional or international application)
item (1) DK	18 July 1997 (18.07.97)	0878/97	
item (2) US	22 July 1997 (22.07.97)	60/053,451	
item (3)			

Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required):

☒ The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s) : (1)

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA / EPO

Earlier search Fill in where a search (international, international-type or other) by the International Searching Authority has already been carried out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. Identify such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request:

Country (or regional Office): EP Date (day/month/year): 29 July 1997 Number: RS 99212 DK

Box No. VIII CHECK LIST

This international application contains the following number of sheets:

- 1. request : 4 sheets
- 2. description : 29 sheets
- 3. claims : 3 sheets
- 4. abstract : 1 sheets
- 5. drawings : 4 sheets

Total : 41 sheets

This international application is accompanied by the item(s) marked below:


- 1. ☐ separate signed power of attorney
- 2. ☐ copy of general power of attorney
- 3. ☐ statement explaining lack of signature
- 4. ☐ priority document(s) identified in Box No. VI as item(s):
- 5. ☒ fee calculation sheet
- 6. ☐ separate indications concerning deposited microorganisms
- 7. ☐ nucleotide and/or amino acid sequence listing (diskette)
- 8. ☐ other (specify):

Figure No. 1 of the drawings (if any) should accompany the abstract when it is published.

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Copenhagen, 16 July 1998
Plougmann, Vingtoft & Partners


Henry Sogaard

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority specified by the applicant: ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 29 January 1999 (29.01.99)	
International application No. PCT/DK98/00335	Applicant's or agent's file reference 19975 PC 1
International filing date (day/month/year) 16 July 1998 (16.07.98)	Priority date (day/month/year) 18 July 1997 (18.07.97)
Applicant ROUAU, Xavier et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
09 January 1999 (09.01.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Lazar Joseph Panakal
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

The demand must be filed directly with the competent International Preliminary Examining Authority, or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:
IPEA/ EPO

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference	
International application No. PCT/DK98/00335	International filing date (day/month/year) 16 July 1998 (16.07.98)
Applicant's or agent's file reference 19975 PC 1 (Earliest) Priority date (day/month/year) 18 July 1997 (18.07.97)	
Title of invention A COMPOSITION COMPRISING AN ENZYME HAVING GALACTOSE OXIDASE ACTIVITY AND USE THEREOF	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) DANISCO A/S Langebrogade 1 DK-1001 Copenhagen K	Telephone No.: Facsimile No.: Teleprinter No.:
State (that is, country) of nationality: DK	State (that is, country) of residence: DK
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) ROUAU, Xavier 16, rue la Raffinerie 34000 Montpellier France	
State (that is, country) of nationality: FR	State (that is, country) of residence: FR
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) SCHRØDER, Mette Lykkegårdsvej 29 6000 Kolding Denmark	
State (that is, country) of nationality: DK	State (that is, country) of residence: DK
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

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State (that is, country) of nationality:

State (that is, country) of residence:

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State (that is, country) of nationality:

State (that is, country) of residence:

Name and address: (Familyname followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

☐ Further applicants are indicated on another continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*Plougmann, Vingtoft & Partners
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☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☐ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|----------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | 1 sheets |
| 6. other (specify) | : | sheets |

For International Preliminary Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

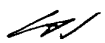
The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Plougmann, Vingtoft & Partners
Copenhagen, 7 January 1999


Henry Sogaard

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

- | | |
|--|---|
| 3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. | <input type="checkbox"/> The applicant has been informed accordingly. |
| 4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5. | |
| 5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | |

For International Bureau use only

Demand received from IPEA on:

04 OKT. 1999

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

PLOUGMANN, VINGTOFT & PARTNERS
Sankt Annae Plads 11
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DK-1021 Copenhagen K
DANEMARK

PCT

FLV/LPS

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

30.09.99

Applicant's or agent's file reference
19975 PC 1

IMPORTANT NOTIFICATION

International application No.
PCT/DK98/00335International filing date (day/month/year)
16/07/1998Priority date (day/month/year)
18/07/1997Applicant
DANISCO A/S et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

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Authorized officer

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 19975 PC 1		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DK98/00335	International filing date (day/month/year) 16/07/1998	Priority date (day/month/year) 18/07/1997	
International Patent Classification (IPC) or national classification and IPC A21D8/04			
Applicant DANISCO A/S et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 3 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 09/01/1999		Date of completion of this report 30.09.99	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer ESTANOL. I Telephone No. +49 89 2399 8647 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/DK98/00335

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-29 as originally filed

Claims, No.:

1-23 as received on 12/08/1999 with letter of 10/08/1999

Drawings, sheets:

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/DK98/00335

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-23
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-23
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-23
	No:	Claims	

2. Citations and explanations

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Item V.

Reference is made to the following document:

D1: WO-A-96 39851

D1 discloses a composition comprising hexose oxidase, a substrate for the enzyme having galactose oxidase activity (e.g. cereal flours or dough) and a further enzyme (e.g. a cellulase, a hemicellulase, a xylanase, a starch degrading enzyme, a glucose oxidase, a lipase or a protease). The composition of D1 improves the rheological properties of a flour dough and the quality of the finished product made from such a dough (e.g. a noodle or an alimentary paste product) (see claims 1 18, page 4, lines 15-29, page 5, lines 30-34, page 12, lines 1-8 and examples 3-5).

Novelty:

The subject-matter of independent claims 1 (composition), 15 (method), 18 (method) and 19 (use) is new over D1 since the oxidoreductase used is galactose oxidase instead of hexose oxidase (Article 33(2) PCT).

For the same reason, the subject-matter of dependent claims 2-14, 16-17 and 20-23 is new over D1 (Article 33(2) PCT).

Inventive step:

The problem underlying the present invention is how to provide alternative compositions which improve the rheological properties of a flour dough and the quality of the finished product made from such a dough.

The closest prior art D1 solves the same problem by providing a composition which comprises hexose oxidase. The advantage shown by the compositions of D1 is that hexose oxidase is capable of oxidizing D-glucose and several other reducing sugars including maltose, lactose, galactose, xylose arabinose and cellobiose and consequently the addition of a substrate for the enzyme to the dough is not required. It is known from D1 that glucose oxidase has also been utilized in compositions for improving the rheological properties of the dough. In this case, the addition of an oxidable substrate for said enzyme is required (see page 4, lines 7-29 of D1).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/DK98/00335

The difference between the compositions of present claim 1 and the compositions of the cited prior art is that the former uses galactose oxidase.

It is known from D1 that the content of galactose in cereal flour or dough is 0.001% in the cereal flour and 0.01% in the dough. The content of galactose is lower than the content of maltose (2.6% and 1.4%, respectively) and even lower than the content of glucose (0.25% and 0.72%, respectively) in cereal flour or dough.

Thus, D1 teaches away from using galactose oxidase as oxidizing enzyme. Moreover, it cannot be derived from the cited prior art that adding galactose or galactose containing compounds (e.g. arabinogalactan) to the composition improves the rheological properties of a flour dough and the quality of the finished product made from such a dough, as shown in Figure 4.

Consequently, the subject-matter of claims 1 to 23 involves an inventive step (Article 33(3) PCT).

Industrial applicability:

The subject-matter of claims 1 to 23 is applicable in the food industry (Article 33(4) PCT).

Item VIII.

The subject-matter of claim 2 is not referred to in the description. Claim 2 is therefore not supported by the description as required by Article 6 PCT.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.

19975PC1

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International Patent Application No. PCT/DK98/00335

Danisco A/S et al

Our ref: 19975 PC1

5

NEW CLAIMS, AUGUST 1999

1. A composition comprising as a first component a galactose oxidase (EC 1.1.3.9) and as a second component an oxidizable substrate for the galactose oxidase and/or an enzyme
10 which is capable of converting a compound into a substrate for the galactose oxidase.

2. A composition according to claim 1 wherein the second component oxidizable substrate is at least dimeric with respect to galactose.

15 3. A composition according to claim 1 or 2 wherein the galactose oxidase is derived from an organism which is selected from the group consisting of a plant species, a fungal species and a bacterial species.

4. A composition according to claim 1 wherein the compound which can be converted into
20 a substrate for the galactose oxidase is a galactose containing compound.

5. A composition according to claim 1 wherein the compound which can be converted into a substrate for the galactose oxidase is a compound naturally present in cereal flour or a component hereof.

25

6. A composition according to claim 5 wherein the compound naturally present in cereal flour is a pentosan or a xylan.

7. A composition according to claim 1 which comprises a compound which is an
30 oxidizable substrate for the galactose oxidase.

8. A composition according to claim 7 wherein said oxidizable substrate compound is a component of a compound naturally present in cereal flour.

AMENDED SHEET

19975PC1

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9. A composition according to claim 8 wherein the oxidizable substrate compound is selected from the group consisting of a galactan, a galactose oligomer or dimer, or galactose
- 5 10. A composition according to claim 9 wherein the oxidizable substrate compound is lactose.
11. A composition according to claim 1 wherein the second component is an enzyme selected from the group consisting of a hemicellulase, a pentosanase, a xylanase, an
- 10 arabinofuranosidase, a mannanase, a galactanase and a β -galactosidase.
12. A composition according to claim 1 which comprises a further enzyme component: selected from the group consisting of a cellulase, a starch degrading enzyme, a lipase and a protease.
- 15 13. A composition according to any of claims 1-12 further comprising a non-enzymic dough additive compound.
14. A composition according to claim 1 wherein the amount of galactose oxidase is in the
- 20 range of 1 to 10,000 units pr g.
15. A method of preparing a flour dough comprising adding to the dough an amount of the composition of any of claims 1-14 which is sufficient to obtain an amount of galactose oxidase activity in the dough which is in the range of 1 to 10,000 units per kg of flour.
- 25 16. A method according to claim 15 wherein the flour dough is a noodle dough.
17. A method according to claim 16 wherein the dough is an alimentary paste dough.
- 30 18. A method of preparing a bakery product, comprising baking the flour dough obtained by the method of claim 15.
19. Use of the composition of claim 1 as a dough and/or bread improving agent.

AMENDED SHEET

19975PC1

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20 Use according to claim 19 wherein the composition comprises a further enzyme component selected from the group consisting of a cellulase, a starch degrading enzyme a lipase and a protease.

5 21. Use according to claim 19 or 20 wherein the composition is one further comprising a non-enzymic dough additive compound.

22. Use according to claim 19 or 20 wherein the galactose oxidase is added to the dough ingredients, dough additives or the dough in the form of a preparation substantially not
10 containing other enzyme activities.

23. Use according to claim 19 wherein the galactose oxidase is provided in the form of a crude enzyme preparation.

AMENDED SHEET

International Preliminary Examining Authority
European Patent Office
D-80298 München
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BY TELEFAX AND CONFIRMATION BY MAIL

10 August 1999

International Patent Application No. PCT/DK98/00335
Publication No. WO 99/03351
Danisco A/S
Galactose oxidase
Our ref: 19975 PC 1

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Dear Sirs,

Referring to the written opinion dated 11 May 1999; applicant hereby submits a new set of claims.

In the new set of claims, claim 1 has been amended so as to relate to galactose oxidase (EC 1.1.3.9), and previous claims 4 and 17 have been deleted and the new claims are renumbered accordingly.

Novelty

D1 discloses a composition for improving the rheological properties of a flour dough comprising an oxidoreductase which is at least capable of oxidising maltose such as hexose oxidase (EC 1.1.3.5) (see page 5, line 30) whereas the oxidoreductase of the composition of the present invention is galactose oxidase (EC 1.1.3.9).

Hence, the composition of the present invention is not the same as disclosed in D1, and thus it is submitted that the subject matter of new claims 1-23 is novel over the disclosure of D1 and complies with the novelty requirements of the PCT.

Inventive step

Inventive step was not acknowledged for previous claims 1-25.

The dough and bread improving composition of the present invention comprises, in addition to galactose oxidase, an oxidisable substrate for the galactose oxidase



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and/or an enzyme, which is capable of converting a galactose-containing compound into a substrate for the galactose oxidase.

It was unexpectedly found by the present inventors that other substrates than galactose, such as partially hydrolysed arabinogalactan, are superior to galactose as substrates for galactose oxidase.

Cereal flour has a natural content of non-starch polysaccharides comprising galactose moieties as structural elements, in particular hemicellulose compounds such as arabinogalactan. Arabinogalactan is a glycoprotein consisting predominantly of a galactose- and arabinose-containing polysaccharide and a protein.

Galactose as free molecules could, on the face of it, be considered as the preferred oxidisable substrate for galactose oxidase, and it is generally expected to be the optimum substrate for this enzyme. However, it was surprisingly found by the inventors that under dough conditions galactose moieties when present in more complex molecules, are significantly more accessible to oxidation by galactose oxidase than are galactose monomers as such.

This can e.g. be seen from Figure 4 in the specification, which illustrates the oxidation by galactose oxidase of three different galactose-containing substrates namely arabinogalactan, which has been subjected to arabinofuranosidase hydrolysis (Ag+araf.), galactose and di-galactose.

It is clearly seen from Figure 4 that arabinogalactan, which has been subjected to arabinofuranosidase hydrolysis, i.e. arabinose has been released from the galactan chain, is a superior substrate for galactose oxidase as compared to galactose. Similarly, di-galactose was also found to be a very good substrate for galactose oxidase, and was nearly as efficient as arabinose-released arabinogalactan.

In contrast hereto, galactose, i.e. galactose monomer, was found to be a relatively poor substrate for galactose oxidase as it was approximately three times less efficient as compared to arabinose-released arabinogalactan (Figure 4).

Thus, in conclusion, it was unexpected and could not be predicted by the inventors that galactose oxidase under dough conditions is capable of oxidising other substrates than galactose, and it was not predictable that substrates such as galactans, galactose oligomers and galactose dimers were greatly superior to galactose.

It is not suggested or disclosed in D1 that other substrates than galactose could be advantageous substrates in a composition comprising galactose oxidase as disclosed in the present application.

On the contrary, D1 teaches away from the finding that other substrates than galactose are superior, as it can be derived from D1 that, due to the low levels of galactose in cereal flour and dough, the use of galactose in a dough improving composition comprising an oxidoreductase could be a promising route to take.

Thus, it cannot be concluded from D1 that other substrates than galactose, such as partially hydrolysed arabinogalactan, are superior to galactose as substrates for galactose oxidase under dough conditions.

In conclusion, it is submitted that the composition of the present invention complies with the inventive step requirements of the PCT.

Item VIII

It is submitted that claim 2 is supported by the description on page 8, lines 16-20, and that D1 is identified on page 3, lines 22-23 in the description.

In case the Examiner does not agree that the subject matter of the new claims is novel and involves an inventive step, a telephone interview with the Examiner pursuant to Rule 66.6 PCT is kindly requested prior to the issuance of a preliminary examination report (direct telephone number +45 33 63 93 49).

Yours sincerely,

Plougmann, Vingtoft & Partners


Flemming Vester

International Patent Application No. PCT/DK98/00335

Danisco A/S et al

Our ref: 19975 PC1

5

NEW CLAIMS, AUGUST 1999

1. A composition comprising as a first component a galactose oxidase (EC 1.1.3.9) and as a second component an oxidizable substrate for the galactose oxidase and/or an enzyme
10 which is capable of converting a compound into a substrate for the galactose oxidase.
2. A composition according to claim 1 wherein the second component oxidizable substrate is at least dimeric with respect to galactose.
- 15 3. A composition according to claim 1 or 2 wherein the galactose oxidase is derived from an organism which is selected from the group consisting of a plant species, a fungal species and a bacterial species.
4. A composition according to claim 1 wherein the compound which can be converted into
20 a substrate for the galactose oxidase is a galactose containing compound.
5. A composition according to claim 1 wherein the compound which can be converted into a substrate for the galactose oxidase is a compound naturally present in cereal flour or a component hereof.
25
6. A composition according to claim 5 wherein the compound naturally present in cereal flour is a pentosan or a xylan.
7. A composition according to claim 1 which comprises a compound which is an
30 oxidizable substrate for the galactose oxidase.
8. A composition according to claim 7 wherein said oxidizable substrate compound is a component of a compound naturally present in cereal flour.

9. A composition according to claim 8 wherein the oxidizable substrate compound is selected from the group consisting of a galactan, a galactose oligomer or dimer, or galactose.
- 5 10. A composition according to claim 9 wherein the oxidizable substrate compound is lactose.
11. A composition according to claim 1 wherein the second component is an enzyme selected from the group consisting of a hemicellulase, a pentosanase, a xylanase, an
- 10 arabinofuranosidase, a mannanase, a galactanase and a β -galactosidase.
12. A composition according to claim 1 which comprises a further enzyme component selected from the group consisting of a cellulase, a starch degrading enzyme, a lipase and a protease.
- 15 13. A composition according to any of claims 1-12 further comprising a non-enzymic dough additive compound.
14. A composition according to claim 1 wherein the amount of galactose oxidase is in the
- 20 range of 1 to 10,000 units pr g.
15. A method of preparing a flour dough comprising adding to the dough an amount of the composition of any of claims 1-14 which is sufficient to obtain an amount of galactose oxidase activity in the dough which is in the range of 1 to 10,000 units per kg of flour.
- 25 16. A method according to claim 15 wherein the flour dough is a noodle dough.
17. A method according to claim 16 wherein the dough is an alimentary paste dough.
- 30 18. A method of preparing a bakery product, comprising baking the flour dough obtained by the method of claim 15.
19. Use of the composition of claim 1 as a dough and/or bread improving agent.

20. Use according to claim 19 wherein the composition comprises a further enzyme component selected from the group consisting of a cellulase, a starch degrading enzyme, a lipase and a protease.

5 21. Use according to claim 19 or 20 wherein the composition is one further comprising a non-enzymic dough additive compound.

22. Use according to claim 19 or 20 wherein the galactose oxidase is added to the dough ingredients, dough additives or the dough in the form of a preparation substantially not
10 containing other enzyme activities.

23. Use according to claim 19 wherein the galactose oxidase is provided in the form of a crude enzyme preparation.

TENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 19975 PC 1	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/DK 98/ 00335	International filing date (day/month/year) 16/07/1998	(Earliest) Priority Date (day/month/year) 18/07/1997
Applicant DANISCO A/S et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ **Certain claims were found unsearchable**(see Box I).

2. ☐ **Unity of invention is lacking**(see Box II).

3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the **title**, ☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is:

Figure No. 1 ☒ as suggested by the applicant.

☐ None of the figures.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

**PLOUGMANN
VINGTOFT
& PARTNERS**

PCT

To:

PLOUGMANN, VINGTOFT & PARTNERS
Sankt Annae Plads 11
P.O. Box 3007
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DANEMARK

14 MAJ 1999

FLV/UPJ

WRITTEN OPINION

(PCT Rule 66)

Date of mailing
(day/month/year)

11. 05. 99

Applicant's or agent's file reference

19975 PC 1

REPLY DUE

within 3 month(s)
from the above date of mailing

International application No.

PCT/DK98/00335

International filing date (day/month/year)

16/07/1998

Priority date (day/month/year)

18/07/1997

International Patent Classification (IPC) or both national classification and IPC

A21D8/04

Applicant

DANISCO A/S et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain document cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **18/11/1999.**

Name and mailing address of the international preliminary examining authority:



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Authorized officer / Examiner

ESTANOL, I

Formalities officer (incl. extension of time limits)

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WRITTEN OPINION

International application No. PCT/DK98/00335

I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

Description, pages:

1-29 as originally filed

Claims, No.:

1-25 as originally filed

Drawings, sheets:

1/4-4/4 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-3,5-16,18-25
Inventive step (IS)	Claims	1-25
Industrial applicability (IA)	Claims	

2. Citations and explanations

s e separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Item V.

Reference is made to the following document:

D1: WO-A-96 39851

D1 discloses a composition comprising an oxidoreductase having galactose oxidase activity (e.g. hexose oxidase), a substrate for the enzyme having galactose oxidase activity (e.g. cereal flours or dough) and a further enzyme (e.g. a cellulase, a hemicellulase, a xylanase, a starch degrading enzyme, a glucose oxidase, a lipase or a protease). The composition of D1 improves the rheological properties of a flour dough and the quality of the finished product made from such a dough (e.g. a noodle or an alimentary paste product) (see claims 1 18, page 4, lines 15-29, page 5, lines 30-34, page 12, lines 1-8 and examples 3-5).

Novelty:

The subject-matter of independent claims 1 (composition), 16 (method), 20 (method) and 21 (use) is therefore not new over D1 (Article 33(2) PCT).

For the same reason, the subject-matter of dependent claims 2, 3, 5-15, 18-19 and 22-25 is not new over D1 (Article 33(2) PCT).

The subject-matter of claims 4 and 17 is new over D1 since the oxidoreductase used is galactose oxidase (Article 33(2) PCT).

Inventive step:

The problem underlying the present invention is how to provide alternative compositions which improve the rheological properties of a flour dough and the quality of the finished product made from such a dough.

The closest prior art D1 solves the same problem by providing a composition which comprises hexose oxidase. The advantage shown by the compositions of D1 is that hexose oxidase is capable of oxidizing D-glucose and several other reducing sugars including maltose, lactose, galactose, xylose arabinose and cellobiose and consequently the addition of a substrate for the enzyme to the dough is not required.

**WRITTEN OPINION
SEPARATE SHEET**

International application No. PCT/DK98/00335

It is known from D1 that glucose oxidase has also been utilized in compositions for improving the rheological properties of the dough. In this case, and due to the low levels of glucose in cereal flour or dough, the addition of an oxidable substrate for said enzyme is required (see page 4, lines 7-29 of D1). *addition of substrate*

The difference between the compositions of present claim 4 and the compositions of the cited prior art is that the former uses galactose oxidase.

It is known from D1 that the content of galactose in cereal flour or dough is 0.001% in the cereal flour and 0.01% in the dough. The content of galactose is lower than the content of maltose (2.6% and 1.4%, respectively) and even lower than the content of glucose (0.25% and 0.72%, respectively) in cereal flour or dough.

Thus, it would be a normal design procedure for the skilled man to utilize any oxidoreductase able to reduce a sugar present in the flour or dough and to add the corresponding substrate for the enzyme if the levels of the selected sugar in the flour or dough is too low. The advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claims 4 and 17 lacks an inventive step (Article 33(3) PCT).

Industrial applicability:

The subject-matter of claims 1 to 25 is applicable in the food industry (Article 33(4) PCT).

Item VIII.

The subject-matter of claim 2 is not referred to in the description. Claim 2 is therefore not supported by the description as required by Article 6 PCT.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.



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Correspondence with the EPO on PCT Chapter II demands

In order to ensure that your PCT Chapter II demand is dealt with as promptly as possible you are requested to use the enclosed self-adhesive labels with any correspondence relating to the demand sent to the Munich Office.

- One of these labels should be affixed to a prominent place in the upper part of the letter or form etc. which you are filing.